

Fully-Automated, Agricultural Application using Unmanned Aircraft, Phase I

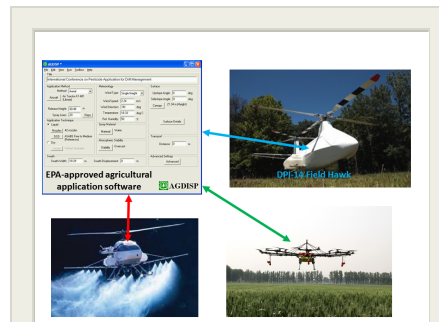
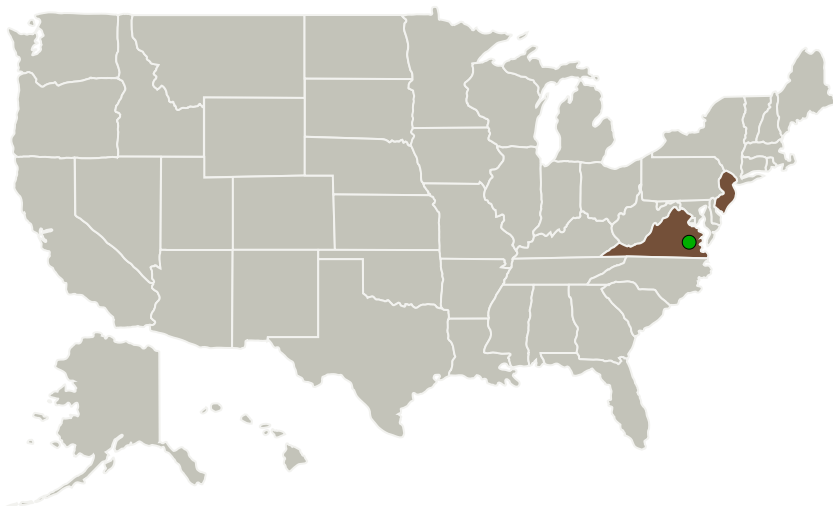
Completed Technology Project (2015 - 2015)



Project Introduction

Interest in civilian use of Unmanned Aircraft Systems (UAS) has increased greatly in recent years and is expected to grow significantly in the future. NASA is involved in UAS research that would greatly benefit from advancing the ability of UAS to make real-time decisions based on sensor data with little human oversight. This SBIR effort is designed to develop and demonstrate this capability by installing and executing an onboard system on an existing UAS platform to provide a fully-automated, agricultural application process managed entirely by EPA-approved software. This is a high-value civilian application particularly suited to UAS given the dangers posed by maneuvering manned aircraft at extremely low altitudes. The SBIR effort will be performed by installing a modified version of Continuum Dynamics, Inc. (CDI) AGDISP® agricultural chemical application software onboard a specially modified Dragonfly Pictures Inc. (DPI) DP-14 Field Hawk UAS. The project would see the development of an onboard sensing and management system to fully-automate the process for agricultural application in a manner that meets EPA regulations for chemical deposition and FAA requirements for airworthiness. Phase I will establish feasibility by demonstrating an ability to perform the required onboard sensing, communication between the UAS and management software, and execution of the software-determined flight path and spraying strategy based on chemical deposition patterns determined by the software for prevailing environmental conditions. Phase II would see the design, development and implementation of the fully-automated system along with a flight demonstration.

Primary U.S. Work Locations and Key Partners



Fully-Automated, Agricultural Application using Unmanned Aircraft, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

Fully-Automated, Agricultural Application using Unmanned Aircraft, Phase I

Completed Technology Project (2015 - 2015)



Organizations Performing Work	Role	Type	Location
Continuum Dynamics, Inc.	Lead Organization	Industry	Ewing, New Jersey
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
New Jersey	Virginia

Project Transitions

▶ **June 2015:** Project Start

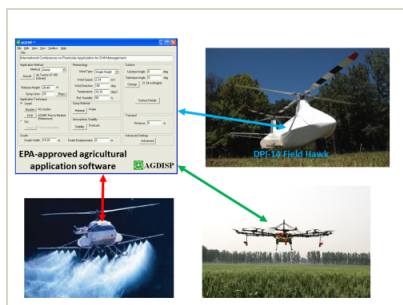
✓ **December 2015:** Closed out

Closeout Summary: Fully-Automated, Agricultural Application using Unmanned Aircraft, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/139022>)

Images



Briefing Chart Image

Fully-Automated, Agricultural Application using Unmanned Aircraft, Phase I

(<https://techport.nasa.gov/image/133577>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Continuum Dynamics, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

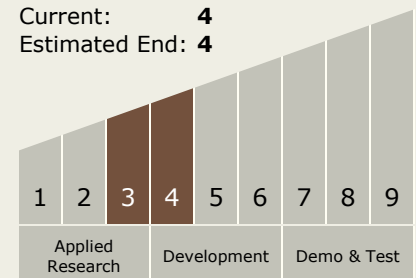
Carlos Torrez

Principal Investigator:

Daniel A Wachspress

Technology Maturity (TRL)

Start: 3
Current: 4
Estimated End: 4



Fully-Automated, Agricultural Application using Unmanned Aircraft, Phase I

Completed Technology Project (2015 - 2015)



Technology Areas

Primary:

- TX10 Autonomous Systems
 - └ TX10.1 Situational and Self Awareness
 - └ TX10.1.1 Sensing and Perception for Autonomous Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System